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[73]专利权人 耿艳楼

地址 050018河北省石家庄市裕华中路5号

[72]设计人 耿艳楼

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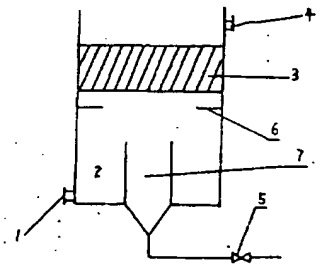
[54]实用新型名称 一种无需反冲洗的全自动过滤器

[57]摘要

本实用新型涉及一种无需反冲洗的全自动连续运行过滤器，该过滤器由进水口1、澄清区2、过滤层3，出水口，排泥阀5，扰动装置6和浓缩区7组成，过滤层3的滤料采用密度小于水的密度的轻型滤料，液压控制的排泥阀5可根据过滤过程中过滤器内的水压变化自动开启和关闭，通过在过滤器内设置机械扰动装置，利用其对滤料的扰动作用来完成滤料的清洗。本实用新型的过滤器可用于对水和废水进行过滤处理，其特点是无需进行反冲洗，因而可节省设备，简化操作。



权 利 要 求 书

1、一种全自动连续运行过滤器，由进水口、澄清区、 过滤层、出水口、浓缩区组成，其特征在于过滤层的滤料采用密度小于水的密度的轻型滤料，在过滤器的中部设置了一组扰动装置，浓缩区的底部通过管线与排泥阀相连，排泥阀采用根据过滤过程中过滤器内的水压变化自动开启和关闭的液压控制阀。

2、如权利要求1所述的过滤器，其特征在于上述扰动装置为一组挡板。

说　明　书

一种无需反冲洗的全自动过滤器

本实用新型涉及一种全自动连续运行的水处理装置，尤其涉及一种无需反冲洗的全自动连续运行的过滤器。

现行的水处理所使用的过滤器在运行过程中，要周期性地停止进水并同时开启反冲洗水泵，对滤料进行反冲洗，使得过滤过程成为非连续性操作，这不仅增加了操作的复杂性，而且还由于水泵的反复停启增大了电能消耗，缩短了水泵的寿命。过滤器反冲洗所要求的反冲洗强度较高，所要求的反冲洗时间较长，过滤器自身所消耗的水量较大。此时，这种过滤器对进水水质要求较高，当进水中的悬浮固体含量超过50mg/l时，便需在过滤器前设置沉淀或澄清装置，因而增加了工艺流程的复杂性。反冲洗带来的又一问题是需要设置专门的反冲洗水池和反冲洗水泵，增加了水处理设备的投资，也加重了设备维修任务。

本实用新型的目的在于提供一种无需进行反冲洗的过滤器，以克服已有技术的过滤器存在的上述缺点。

本实用新型的另一目的在于提供一全自动连续运行的水处理过滤器。以克服已有技术的不足。

本实用新型的目的是这样实现的，本实用新型的过滤器由进水口，澄清区、过滤层、浓缩区及液压控制的排泥阀组成。通过在过滤器内设置机械扰动装置，利用其对滤料的扰动作用来完成滤料的清洗。

下面参照附图对本实用新型进行详细描述。

图1为本实用新型的过滤器的示意图。

图中，1表示进水口，2表示澄清区，3表示过滤区，4表示出水口，5表示排泥阀，6表示扰动装置，7表示浓缩区。

本实用新型的过滤器为一直立的反应器，进水口1设在过滤器的下部，过滤器下部的中心是浓缩区7，外部是澄清区2，进水在经过滤料之前，必须先经过一澄清区2，澄清区2的作用有两个，第一浓缩滤料所截留的污泥，第二对悬浮物含量较高的进水（悬浮物含量可高达5000mg/l）进行预处理，以减轻滤料层的负担。

在过滤器的中部设置了一组扰动装置6，扰动装置6可有多种形式，一种最简单的形式是挡板，扰动装置的数量可根据过滤器的直径大小而定，稍多些或稍少对滤料清洗效果影响不大。

在过滤器的上部设有过滤层3、出水口4位于过滤层3之上。

此外，浓缩区7的底部是一个锥斗形的底部，并通过管线与排泥阀5相连接，该排泥阀是一个液压控制阀，它可根据过滤过程中过滤器内的水压变化自行开启和关闭该排泥阀5，以便完成排泥过程。

过滤层3采用了密度小于水的密度的轻型滤料，利用滤料和污泥的密度差，完成扰动后滤料和污泥的分离过程，使清洗后的滤料重新返回过滤区，而污泥进入澄清区。

本实用新型的过滤器的工作过程如下：

进水经进水口，旋进入过滤器的澄清区2、经澄清区2预处理后进入过滤层3进行过滤，过滤层3的出水经出水口4流出过滤器，随着过滤过程的进行，滤层3的阻力加大，滤层下面水的压力增加，当其压力增大到一定程度时，排泥阀5自动开启，浓缩区7的

污泥经排泥阀5排出过滤器，随着排泥过程的进行， 过滤器内的液面下降，漂浮于水中的滤料也随之下降，滤料在下降过程中受对到扰动装置6的扰动作用而得到清洗， 当过滤器内的液面下降到一定位置时，排泥阀5自动关闭， 此时由于进水还在不停地进入过滤器，过滤器内的液面又会重新上开，滤料也会随之上升而返回过滤层3，由于滤料和污泥之间存在着密度差， 滤料的上浮速度大于污泥的上浮速度，使得滤料和污泥得以分离，分离后的污泥进入浓缩区7进行浓缩。

本实用新型的过滤器与已有技术的过滤器相比，具有以下优点：

1、无需进行反冲洗，省掉了反冲洗水池和反冲洗水泵， 使设备资降低，实现了连续运行，简化了操作。

2、由于无需进行反冲洗，因而提高了水的利用率。

3、实现了全自动运行，可减少人工数量。降低了运行成本。

4、可适用于悬浮物含量很高的进水，增强了过滤器的适应性和运行稳定性。

5、所排出的污泥是经过浓缩的污泥，因而减少了排泥量，也减轻了排放污泥的后处理负担。

6、该过滤器结构简单，加工方便，无需任何辅助配套设施，节省了基建安装费用。

说 明 书 附 图

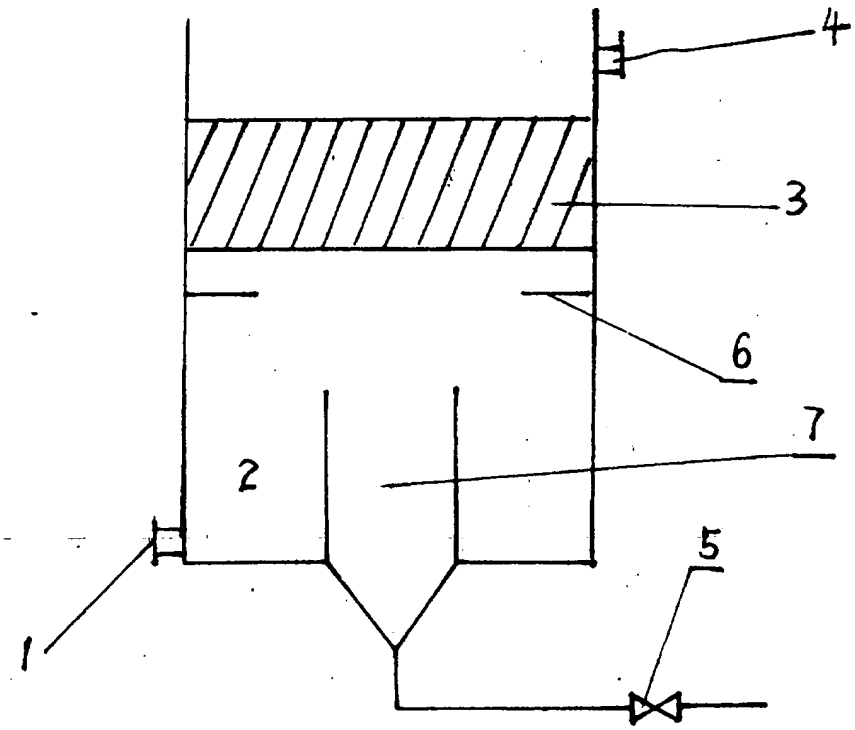


图 1

Application Number: 94219937.5

A full-automatic filter without backflushing

This utility model relates to a full-automatically and continuously operated filter without backflushing, comprising a water inlet 1, a clarification area 2, a filtering layer 3, a water outlet, a sludge valve 5, a disturbing device 6, and a concentrating area 7. The filtering layer 3 is made of light filtering material with lower density than that of water, the hydraulically controlled sludge valve 5 can automatically open and close according to change in the water pressure in the filter during filtering, and clean the filtering materials by means of the mechanical disturbing device which is installed in the filter and plays a disturbing role to the filtering materials. The filter of this utility model is applicable for filtering treatment of the water and the wastewater, featured by no backflushing, thus resulting in economizing equipment and simplify operation.

Claims

1. A full-automatically and continuously operated filter, comprising a water inlet, a clarification area, a filtering layer, a water outlet, and a concentrating area, wherein the filtering layer is made of light filtering material with lower density than that of water, a set of disturbing devices is installed in the middle of the filter, the bottom of the concentrating area is connected to the sludge valve through the pipeline, and the sludge valve is a hydraulic control valve that can automatically open and close according to change in the water pressure in the filter during filtering.

2. Said filter according to claim 1, wherein said disturbing device is a set of dampers.

A full-automatic filter without backflushing

This utility model relates to a full-automatically and continuously operated water treatment device without backflushing, especially to a full-automatically and continuously operated water without backflushing.

The filter used in the current water treatment, during its operation, regularly stops water input and meanwhile starts backflushing pump for backflushing the filtering materials so as to make the filtering process become a non-continuous operation. Such mode not only increases complexity of the operation, but also increases electric energy consumption due to repeated stops and starts of the water pump, thus shortening service life of the pump. The backflushing of the filter proposes such requirements as high backflushing strength, long backflushing time and much water consumption of the filter itself. In such case, such filter has high requirement for the water quality. It is necessary to install settlement or clarification device in front of the filter when the contents of the suspending particle contained in the incoming water is more than 50mg/l, and thus increasing complexity of the technical flow. Another problem the backflushing produces is necessity to mount special backflushing water pond and backflushing pump, and thus increasing investment of the water treatment equipment and aggravating equipment repair task.

The object of this utility model is to offer a filter without necessity of backflushing so as to overcome above shortages of existing filter.

Another object of this utility model is to offer a full-automatically and continuously operated water treatment filter so as to overcome shortages of existing technology.

The object of this utility model is reached in such way that the filter of this utility model comprises a water inlet, a clarification area, a filtering layer, a concentrating area and a hydraulic control valve. The filter finishes cleaning of the filtering materials by means of the mechanical disturbing device which is installed in the filter and plays a disturbing role to the filtering materials.

Detailed description of attached figures of this utility model:
Fig. 1 is a sketch of the filter of this utility model.
In the figures, the item 1 refers for inlet pipe, 2 for clarification area, 3 for filtering area, 4 for water outlet, 5 for sludge valve, 6 or disturbing device and 7 for concentrating area.

The filter of this utility model is a vertical reactor, the water inlet 1 is set up under the filter, the concentrating area 7 is set up in the bottom middle of the filter, and the clarification area 2 is set up outside. The incoming water must, before flowing through the filtering materials, pass through the clarification area 2 which has two roles, i.e., concentrating the sludge stopped by the filtering materials, and pre-treating incoming water with high contents of suspending materials (contents of suspending materials up to 5000mg/l), so as to release the load of the filtering materials layer.

A set of disturbing devices 6 is equipped in the middle of the filter. Such devices have different

types, the simplest one of which is to use dampers. The number of the devices can be determined according to diameter of the filter, with no great impact on the cleaning effect of the filtering materials for slightly more or less disturbing devices.

The filtering layer 3 is set up on the filter, and the outlet 4 is arranged over the filter layer 3.

In addition, the bottom of the concentrating area 7 has a shape of cone, and is connected to the sludge valve 5 through the pipeline. The sludge valve is a hydraulically controlled valve, and can automatically open and close according to change in the water pressure in the filter during filtering and then complete the sludge discharge.

The filtering layer 3 is made of light filtering material with lower density than that of water. It uses density difference between the filtering materials and sludge to complete separation of the filtering materials from the sludge after disturbing so as to return the cleaned filtering materials into the filtering area with the sludge entering the clarification area.

The operation of the filter of this utility model is given as follows:
The incoming water, through the water inlet, spins into the clarification area 2 of the filter, where the water is pretreated and then flows into the filtering layer 3 for filtering. The water out of the filtering layer 3 flows out of the filter through the outlet 4. Along with the filtering process, the resistance of the filtering layer 3 increases and the pressure of the water under the filtering layer also increases. When the pressure rises to a certain level, the sludge valve 5 will automatically open, the sludge in the concentrating area 7 is discharged out of the filter through the sludge valve 5. Along with the sludge discharging process, the level in the filter decreases, and thus the level of the filtering materials floating in the water decreases. The filtering materials, during its decrease in level, is disturbed by the disturbing device 6 and then cleaned. When the level in the filter decreases to a certain level, the sludge valve 5 will automatically close. Now the level in the filter will rise again due to continuous flowing of the incoming water into the filter, and the filtering materials will also rise and return back into the filtering layer 3. The filtering materials floats upwards faster than the sludge due to density difference between the filtering materials and sludge so that the filtering materials can be separated from the sludge and then the separated sludge enters into the concentrating area 7 for concentration.

The filter of this utility model has following advantages, compared with the existing filter:
1. It is not necessary to use the backflushing water pond and the backflushing pump due to unnecessary backflushing, resulting in reducing equipment investment, continuous operation and simple operation.
2. The availability of the water is increased due to unnecessary backflushing.
3. The filter can make continuous operation so that the labor number is decreased and the operation cost is reduced.
4. The new filter is applicable for incoming water with high contents of the suspending particles so that the adaptability of the filter and the stability of the operation are strengthened.
5. The discharged sludge is the concentrated sludge, so the sludge is reduced and the post-treatment load of the discharged sludge is relieved.

6. This filter has simple structure and convenient manufacturing mode, without any auxiliary facilities, saving the installation cost of the infrastructure.